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THE DIRECTION IN WHICH MAYAN INSCRIPTIONS SHOULD BE READ

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It is extremely interesting to trace back the struggles of a race or nation of people in their first efforts and endeavors to raise themselves from a state of abject barbarism up to a scale of semi-civilization, entirely separated and uninfluenced by any surrounding culture or enlightenment.

Such was the unique position of the ancient Maya race, whose strange monuments, temples, and bas-reliefs are found so frequently throughout Chiapas, Yucatan, Tabasco, Guatemala, and western Honduras. Undoubtedly the most interesting of these ancient monuments are the strange mural inscriptions, tablets, and records of this unique aboriginal American civilization, the correct interpretation of which is yet to be demonstrated, we trust, by some future Champollion.

Many attempts have been made to read these inscriptions, both in this country and abroad, but the results so far obtained are entirely unsatisfactory. One essential point must first be decided on before entering into a detailed study of the inscriptions of Central America, and that is how the characters are to be read, from the left to the right or the reverse, up or down in columns, or in double columns. This has always been a puzzling question, for we find the katuns or cartouches arranged in rectangular blocks or tablets, in horizontal and vertical lines, and in right angles facing in opposite directions. One would naturally assume that to decide on this important question before we have succeeded in interpreting the characters and general significance of the graven inscriptions would be a useless task. Such, however, is not the case, as a close inspection of the inscriptions will demonstrate.

The most vexatious point in this investigation is the mere fact that the same rule will not always apply in reading the various groups, tablets, and columns of these so-called calculiform glyphs. Dr Brinton emphatically states that whatever the prevailing rule concerning the direction of reading the glyphs might have been, the native artists seemed to have no hesitation in disregarding

it when artistic or other reasons presented themselves.[1] Other conservative students have since reached the same conclusion. We find on consulting the works of the various students of the subject that there is a great divergence of opinion as to the proper method and direction of reading these graven texts. Our first duty, therefore, is to sum up the opinions and evidence produced by each authority, to classify them under the various headings, then to recapitulate the evidence and results thereby obtained and deduct our matured conclusions from the ground covered. For convenience we have classified the various methods proposed as Plan I, II, III, IV, and V, by which names we shall refer to them in the following pages:

Plan I—A. P. Maudslay was of the opinion that the inscriptions or tablets should be read in double columns, from left to right and from top to bottom; also that the large figure at the upper lefthand corner of many of the inscriptions was, as he calls it, "the initial scroll of the series." He believed that inscriptions containing this peculiar heading, and this regular series of portraits underneath, generally began with the same formula, which extended usually through these six or seven squares. His reason for this was that in the sixth square, or sometimes in the latter half of the sixth square, is found a human face, usually in profile, enclosed in a frame or cartouch.[2] Dr Cyrus Thomas thought that the large character at the upper lefthand corner of the Palenque tablet was used much in the same way as we use capital letters, and that the inscriptions are read either in columns from the top downward, or in lines, from the left to the right.[3] He found that in the Manuscript Troano the characters are, as a general rule, placed in columns, to be read from the top downward; but that, where circumstances require it, they are placed in lines, to be read from left to right. He thinks that we would be justified in assuming that the same rule applies to the tablets. But later in his work, after a close examination of the Palenque tablet of the "Cross," and noting the first seven characters of the two columns immediately below the large initial, he seems to have changed his mind and sug-

[1] A Primer of Mayan Hieroglyphics, University of Penna., series of Phil. Lit. and Arch., vol. III, No 2, p. 79.

[2] Explorations of the Ruins and Site of Copan, Central America, in Proc. Roy. Geog. Soc, Sept., 1886, p. 593.

[3] A Study of the Manuscript Troano, Washington, 1882, p. 137.

gests[1] that the remaining characters of these two columns be read by twos to the bottom, and to continue the same way throughout the tablet, taking each double column from top to bottom. This latter suggestion for the reading of double columns will correspond with Mr Maudslay's scheme, and we will therefore place it under this heading (Plan I). His first suggestion we will classify under Plan III. Dr Thomas also says that the lines and columns in the middle portion of the tablet should read from the left to the right along the lines until a column is reached, and then down the column.

Plan II—Dr Brinton believes that the proper reading of the tablets (such as the Tablet of the "Cross") is to begin at the top of the two righthand columns, read them together downward, then the next two to the left in a similar manner; but the last two on the left, those headed by the great *Pax*, should be read from below upward. He thinks that this plan alone corresponds with the natural sequences of the groups of glyphs, and that the huge sign at the upper lefthand corner, instead of being the "initial" glyph, is in reality the terminal.[2] We learn from Dr Förstemann[3] that in manuscripts in long computations the numeral elements are to be read from below upward, and from right to left. This plan differs from Dr Brinton's scheme, but would agree in his reading of the two columns headed by the large glyph, which he reads from below upward, making the large character the terminal.

Plan III—Dr Thomas' first suggestion[4] was that when the characters were arranged in lines, of reading from left to right, and when in columns from top to bottom. This was also the opinion of M. Pousse,[5] while Léon de Rosny also expressed his opinion that the characters should be read from left to right.[6] Professor E. S. Holden arrived at the same conclusion by his mathematical method of examination,[7] and he further says that in the case of

1 Ibid., p. 200.

2 A Primer of Mayan Hieroglyphics, p. 136; also Ancient Phonetic Alphabet of Yucatan, p. 6.

3 Zur Entzifferung der Mayahandschriften, No. II, Dresden, January, 1891.

4 A Study of the Manuscript Troano, op. cit., p. 137.

5 Archives de la Soc. Amer. de France, 1887, pp. 27, 28, 113, et seq.

6 Essai sur le Déchiffrement de l'Écriture Hiératique de l'Amérique Centrale, folio, Paris, 1876.

7 Studies in Central American Picture-writing, First Annual Report of the Bureau Ethnology, p. 223.

columns they were to be read from the top to the bottom. In the case of tablets, they were to be read just as the present page is written. Wilson believed that the tablets were to be read in columns from the top to the bottom and in manuscripts from left to right.[1] Mr M. H. Saville[2] was of the opinion that the large glyph at the upper lefthand corner was the *Pax* glyph, and that it was the initial character of the series. He also points out a number of inscriptions which are headed by *Pax* in a modified form. He does not, however, express an opinion as to the method of reading the remainder of the inscriptions.

Plan IV—Dr P. J. J. Valentini was of the opinion that the inscriptions were to be read from the left to the right in the columnar direction,[3] and in the case of the double columns these are to be read in double columns down to the point where the column of portraits stop. Beyond this point the columns should be read separately, for they stand in this way throughout the tablet,[4] according to his opinion.

Plan V—Brasseur de Bourbourg devoted much attention to the direction of reading the glyphs in the manuscripts, and was greatly influenced by the direction in which the figures appeared to be moving and the way the faces were turned, which in most instances is toward the left. He therefore concluded[5] that the characters should be read by lines, from right to left, and by columns, from the bottom upward; in which method of reading he was followed by Bollaert.[6] This plan agrees perfectly with the method of reading the long computations of numerical elements in the Dresden Codex (pages 61–64, 69–73) pointed out by Dr Förstemann. The numerals found in connection with the figures of snakes on these pages of the Dresden Codex are to be read from the right to the left, and from below upward.[7]

It is of utmost importance that we find out which one of these five diversified methods is the correct one. Until this point is

1 Pre-historic Man, p. 378, et seq.

2 A Comparative Study of the Graven Glyphs of Copan and Quirigua, Jour. Am. Folklore, July-September, 1894, p. 238.

3 Professor Valentini adds that this is also the arrangement as stated by Landa, p. 44.

4 Analysis of the Pictorial Text Inscribed on Two Palenque Tablets, Proc. Amer. Antiq. Soc., Worcester, Mass., 1896, part II, p. 6.

5 Introduction to the Codex Troano, by the Abbé Brasseur de Bourbourg, published by the French government in 1869.

6 Exam. of Cent. Am. Hier., 306.

7 Zur Entzifferung der Mayahandschriften, No. II, Dresden, January, 1891.

settled, it is impossible to know the correct serial arrangement of the cartouches in the inscriptions. This can be done only by close examination and study, not only of the Palenque tablets, but also of others, from various localities, in order that some definite conclusion may be obtained by having at our disposal all possible data. It is immaterial in this investigation as to whether these calculiform glyphs occurring in the graven texts are phonetic, ideographic, or intermixed. One fact is certain, and that is, that whatever form was used, we shall have groups or assemblages of glyphs recurring in the inscription when the same incident, name, or idea is written, and that these recurrences must be governed by certain fixed laws which can be learned only by a close study and analysis of characters and their occurrences and sequences in the inscriptions. Then, again, there must be names of deities, kings, priests, etc, which would recur from time to time in the graven texts, and these can easily be noted by comparison and by the frequency of their occurrence. There are a number of noteworthy points about these records on the manuscripts and tablets which should at once attract the attention of the student. Some of these have previously been pointed out by Dr Brinton, and to these we will add some others which have come under our observation:

1. The faces of deities, priests, etc, in the mural inscriptions and manuscripts are almost always drawn facing the left.

2. The apparent movement of the principal figures, both in the inscriptions and the manuscripts, is generally from the right to the left.

3. The more important parts of the composite characters are placed on the right side, and the affixes added on the left side.

4. In writing the numerals, the bars representing fives are placed to the right, and the dots meaning units are placed to the left.

These four points would make one infer that the lines were written from the right to the left, but we do not believe that we are justified in assuming such a conclusion from such insufficient data. We will mention below a few points which seem to have an important bearing on the direction for reading the inscriptions.

5. In not less than thirteen of the principal inscriptions we find at the upper lefthand corner a glyph of larger dimensions than those following which, with various modifications and ornamentations, bears a great resemblance to *Pax*.

6. Directly under this enlarged glyph, at the upper lefthand corner, follow a series of portraits which, with their ornamentation and affixes, take the space of two columns.

7. A close examination of the Palenque tablet will show that in many cases the characters are found in pairs or groups, which recur frequently throughout the inscription.

8. These pairs and groups of characters are always arranged in such a way that the reading of the inscription by double columns is not interfered with. Should one character of a pair be on the righthand side on one line, the other one will be found on the left side on the line immediately below, following the usual sequence.

9. These pairs are found also in the single vertical columns one above the other, showing that the single vertical column reading is from top to bottom, or for a transverse single line from left to right.

10. The divergence in the direction of reading on some of the inscriptions and manuscripts was not, we believe, caused by the carelessness or capriciousness of the ancient sculptor, but in accordance with fixed laws, a few of which have been discovered.

11. It will be found that all these inscriptions, when in the shape of a tablet, are of such number of vertical columns that it can be divided by two without a remainder. In other words, it can be read by double columns without having an extra column left at the end. They are generally of two, four, six, or more columns, but always of some even number.

12. In some of the inscriptions (for example, the bas-relief of Bernouilli) we find a wider spacing between each set of double vertical columns, as if to give greater prominence to each double set, so that they can be followed and read with greater ease.

Let us now turn our attention to the well known Palenque tablet of the "Cross." One can notice at a glance at this inscription that there is a large glyph at the upper lefthand corner which takes up the space of four ordinary squares. We find this in no other corner. Then directly below this we find seven compound glyphs taking up the space of two regular squares. Six of these contain the profile of a head conjoined with other glyphs. The rest of the group are of uniform size, except that those surrounding the cross are of a smaller type than those on the tablets on each side. One cannot fail to admire the extreme regularity

and uniformity of these tablets and wonder at the skill shown by the ancient sculptor. When my attention was first attracted to the study by the researches of Professor Holden it seemed enigmatical to me how he deduced his conclusions about the direction of reading the glyphs from his mathematical examination of the Palenque tablets. Being trained in mathematical and astronomical research, his conclusions on such a subject seemed to me at that time, on this point, unassailable; nevertheless unsatisfactory. Now, it seems that we have found the reason for this. If the reader will turn to pages 221–223 of his work[1], it will be found that his studies in regard to the direction of reading the glyphs were mostly concentrated on the righthand side of the Palenque tablet of the "Cross," and but little attention was paid to the peculiar initial heading on the lefthand side tablet or the row of double-column glyphs directly beneath the heading. Students familiar with the tablets will readily understand the point which we mean, for this peculiar arrangement at the upper lefthand corner contains the key to the whole enigma.

We do not doubt that had Professor Holden devoted the same study to the lefthand tablet as he did to the righthand side, the results and his conclusions deduced therefrom would have been vastly different. The student habituated to our use of large initial capital letters at the upper lefthand corner in our modern magazines and books naturally assumes that these inscriptions are to be read from left to right, for we generally find in the upper lefthand corner a hieroglyph larger than any of the others, as in the case of the Palenque tablet. It is a noticeable fact that we never see these large forms in any other corner (as at the right side or at either of the lower corners). From the valuable researches of Mr Saville[2] and from other sources we learn that many of the Mayan inscriptions have the enlarged glyph resembling *Pax* at the upper lefthand corner. Let us carefully go through the various inscriptions and find out how many times this occurs and see what results can be deduced. The following inscriptions and tablets are all headed by the large glyph resembling *Pax*, differing only in the ornamentation and affixes:

1 Studies in Central American Picture-writing, op. cit.

2 A Comparative Study of the Graven Glyphs of Copan and Quirigua, op. cit.

1. Inscription on Stela A, Copan, Honduras.
2. Inscription on Altar S, Copan, Honduras.
3. Inscription on Stela I, Copan, Honduras.
4. Inscription on Stela F, Quirigua, Guatemala.
5. Inscription on Tablet of the "Cross," Palenque, Chiapas.
6. Inscription on Stela C, Copan, Honduras (south side).
7. Inscription on Stela C, Copan, Honduras (north side).
8. Inscription on the back wall of Altar No. 3, Palenque, Chiapas.
9. Inscription on the south side of monolith at Quirigua, Guatemala, Maudslay's plate III.[1]
10. Inscription on the south side of monolith at Quirigua, Guatemala, Maudslay's plate XIV.
11. Inscription at Copan, Honduras, Maudslay's plate XVI.
12. Heading of an inscription on the side of a monolith at Quirigua, Guatemala, Maudslay's plate XVII.
13. Heading of an inscription on a vase from Quiché tomb, Guatemala.[2]

Thus we have, at the very least, thirteen important inscriptions bearing this peculiar heading at the upper lefthand corner. We can see no valid reason why these large characters should be the terminals of the inscriptions, as Dr Brinton suggests. As a matter of fact, all the evidence seems to point the opposite way, and we have no hesitation in accepting these large headings as the initial glyphs of the series.

Let us now make a close examination of the various inscriptions and see if we cannot find some occurrences and sequences of the various characters which will help us in deciding the correct direction for reading the graven texts. In our investigation we will take advantage of the peculiar sequences in the Palenque tablet, so ably pointed out by Professor Holden[3] and augmented and continued by Dr Cyrus Thomas.[4] The latter has clearly shown by these sequences that Plan I is the correct method of reading the Palenque tablet; consequently some repetition is necessary in again demonstrating that point. We will present the sequence of the pairs and groups of characters in such a way that the reader may see at a glance the great importance they have in connection with the general direction of reading the inscription. Our attention for the present will be confined

[1] The plates of Mr Maudslay are presented in his article in the Proceedings of the Roy. Geog. Soc., London, Sept., 1886.

[2] Figured by Dr Brinton in his Primer of Mayan Hieroglyphs, p. 140.

[3] Op. cit., 223.

[4] Op. cit, 200.

to the one inscription, commonly known as the Palenque tablet of the "Cross."

We present in figure 1 the index diagram used by Dr Rau for locating the various characters, which we have changed by separating it into double columns, as in A B, C D, E F, etc, so as to show to greater advantage the pairs and sequences that occur in the tablet. According to this plan, we have three double columns on each side of the central figures. If Plan I be correct,

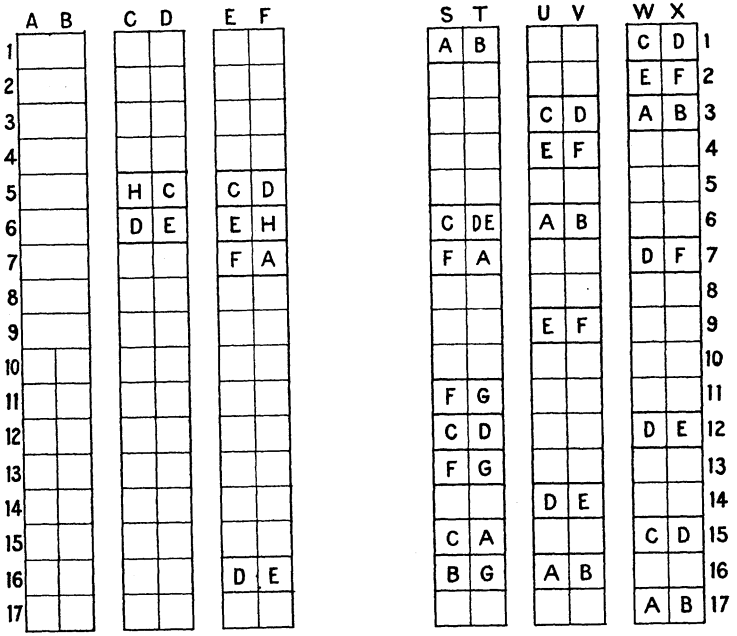

FIG. 1.

we will find these characters occurring in pairs, which must fall in the correct columns. Let us try this and take, for instance, the two characters at the upper lefthand corner of the righthand tablet, S 1, T 1. Let us call S 1 "*A*," and T 1 "*B*," and at each place where this pair occurs we will place the letters A and B. By referring to figure 1 it can readily be seen that this pair occurs in S 1, T 1; W 3, X 3; W 17, X 17; U 6, V 6, and U 16, V 16—a total of five times. These pairs are found always on the same line, and always in the columns to which they belong, according to our theory of reading by double columns in Plan I,

and no exception is found. Now, if one of the pair should occur on one line at the right, and the other on the line below, at the left, it would only tend to strengthen our evidence. This, however, does occur four times. By referring to figure 2 we find at the righthand side of the double column in T 7 our character "*A*," and, on the next line below, at the left side in the square S 8, our character "*B*," just as it should be, making the pair of characters A B follow each other correctly in T 7, S 8; but this

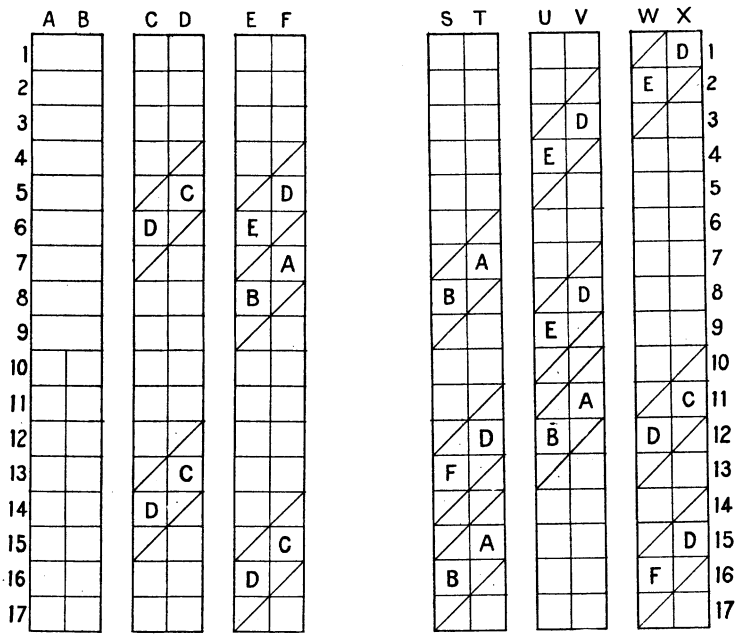

FIG. 2.

may be a mere coincidence. Perhaps we may find others. On closely examining our figure 2, we find it occurs again in the same way in V 11, U 12; T 15, S 16, and F 7, E 8. This makes a total of nine pairs for the characters A B. We think that the mere sequence of the two characters A B would be sufficient to prove this, but to make sure of it we will try another pair of glyphs, and take W 1, X 1. We will call W 1 "*C*," and X 1 "*D*." By referring to figure 1, we learn that this pair is found in W 1, X 1; W 15, X 15; U 3, V 3; S 12, T 12; E 5, D 5—a total on the same horizontal line of five times in the tablet, or six if we count

S 6, T 6 (the latter part of which is a combination of the characters which, for convenience, we call *D* and *E*). Now, let us see if this pair is also found on different transversal lines and in correct order, according to the double-column theory. We find it that way in X 11, W 12; F 15, E 16; D 5, E 6, and D 13, E 14—a total of four times, as shown on our figure 2. This makes a total of ten pairs for the characters C D. It is a noticeable fact also that the same pair is found in R 2, R 3, proving that these single vertical columns are to be read from top to bottom.

Another pair of glyphs commonly associated with each other is found in U 4, V 4 (figure 1). Let us call the character U 4 "*E*," and V 4 "*F*," and note the occurrences of this pair in the tablet. On referring to our figure 1, we find it occurs in U 4, V 4; W 2, X 2; U 9, F 9—a total of three times on the same line. We also find it in the correct order, but on different transversal lines, in X 12, W 13; T 6, S 7, and V 14, U 15, as shown in figure 2, making in all a total of six pairs, three on the same horizontal line and three on different transversal lines.

The pair W 12, X 12 also is found frequently in the tablet. We have already named the character W 12 as "*D*" and the character X 12 as "*E*." By referring to figure 1, we find this pair occurs in W 12, X 12; U 14, V 14; in T 6; E 16, F 16, and C 6, D 6. It also is found on different transversal lines in X 1, W 2; V 3, U 4, and F 5, E 6, as shown in figure 2, making a total of eight times.

It is a noticeable fact that these pairs do not occur at any time in the wrong columns, otherwise it would, if occurring often, or even once (although this might occur by mere coincidence), destroy our evidence. It is surprising also that the characters follow each other so correctly when on different transversal lines, one above at the right, and the other below at the left-hand side of the double column.

The evidence seems to accumulate, the deeper we go into the matter. Let us now take a group of three characters and find out if the sequence is correctly carried out. Take the characters W 1, X 1, W 2, which are placed in this position

C D

E

with each other. By referring to our figure 3 we find these three

characters at the upper righthand corner, which we have previously called C D E. Now, if this same combination can be found occurring in rotation a number of times in the tablet, our evidence is complete. By referring to figure 3 we find it occurs not fewer than seven times in correct rotation as follows: W 1, X 1, W 2; U 3, V 3, U 4; S 6, T 6; V 13, U 14, V 14; E 5, F 5, E 6; D 5, C 6, D 6; D 13, C 14, D 14, and F 15, E 16, F 16. In the group V 13, U 14, V 14, and at three other places on the same

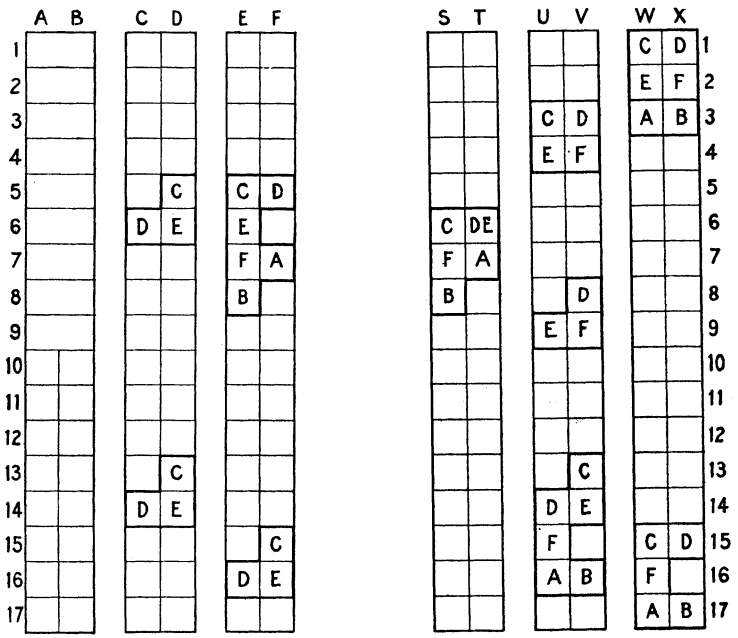

FIG. 3.

tablet, as shown in figure 3, we find the order reversed in this manner—

C

D E

which is absolutely correct according to the sequence of the characters.

We will now select a group of four characters to test the sequence. Let us take W 1, X 1, and W 2, X 2, which, by referring to figure 3, we find at the upper righthand corner, marked C D E F, according to our former plan. We find these four

characters following each other in the correct sequence, in W 1, X 1, W 2, X 2; U 3, V 3, U 4, V 4; S 6, T 6, S 7, and V 13, U 14, V 14, U 15. The last combination takes a peculiar shape as follows:

C
D E
F

but a close examination will prove that the sequence of the characters is correct and in accordance with the double-column theory. Finally, let us take a large group of six characters, as C D E F A B, the six characters at the upper righthand corner of the tablet, as shown in figure 3, in the squares W 1, X 1; W 2, X 2; W 3, X 3. We find this same group in S 6, T 6, S 7, T 7, S 8, making the compound glyph T 6 stand for both D and E, which are combined in one character (figure 3). The first group is found in this shape—

C D
E F
A B

and the second as follows:

C DE
F A
B

We find nearly this same combination in three other places in this tablet, one in this form:

C D
E
F A
B

This contains another character between the characters E and F. Then, again, we find another, as follows,

C
D E
F
A B

in which a new character is placed between the characters F and A. We also find one more group as follows,

C D
F
A B

where we find five of our characters with one new form introduced between F and A, as in the last-mentioned group.

Let us now examine another Palenquean inscription, the tablet on the back wall of the altar, Casa No. 3, forming the frontispiece of Stephen's "Incidents of Travel in Central America," vol. II. We find in this inscription that there are four columns on each side of the central figure, which agrees perfectly with the plan of reading by double columns. Here we find again the large initial glyph and the series of double portrait characters beneath, taking up the space of two squares each. The pairs and sequences do not occur so frequently in this tablet as in the other, but we find enough to verify our former results. We find in the squares N 1, O 1, our pair D E in the correct order and columns, and we find it again in C 15, D 15. In the square A 10 we find a character which we will call "*M*," and in B 10 another, which we will call "*F*," making the pair M F in the correct double columns. Now, at the bottom of the B column we again find the character M, and on looking up at the beginning of the next set of double columns we find its mate, the character F, in C 1, thus making a key or connection between the two sets of double columns. We find this same form of connecting link on the righthand side of the same tablet. At the bottom of the second column we find our character C, and at the top of the columns three and four (N 1, O 1) our characters D and E, making the three characters C, D, and E follow each other exactly as they should, according to the theory of reading by double columns. We have not the slightest doubt but that a close examination of all the other tablets and inscriptions will bring exactly the same results. Lack of space, however, will prevent us from continuing these comparisons.

In looking over Rosny's *Les Documents Écrits de L'Antiquité Américaine*[1] we find a most remarkable corroboration of this the-

[1] *Les Documents Écrits de L'Antiquité Américaine*, by Léon De Rosny; *Mémoires de la Société d'Ethnographie, No. 3*, Paris, 1882. In the appendix to this valuable work Professor Rosny gives a description of this interesting inscription (page 95), supplemented by four chromolithographs from photographs made by the author.

ory of reading the inscriptions by double columns. If the reader will refer to this work and examine plate 10–11 of the Bas-relief of Bernouilli it may at once be seen. This valuable inscription was called to the attention of Professor Rosny while at Dresden by Dr Meyer, who said that it had been deposited at the Musée Ethnographique at Bâle. Rosny visited the museum and photographed and described the inscription, which he named *Bas-relief Yucatèque de Bernouilli.* It is composed of three fragments of sculptured panels of Campêche wood, measuring 1 meter 80 centimeters in height, and was discovered at Tikal, northeast of Lake Peten, Guatemala. The principal panel gives a representation of a priest or other important personage clothed in garments covered with a profusion of rich ornaments and holding in one hand a long spear or lance. On each side of the central figure are interesting inscriptions; that on the left contains four columns of seven cartouches each, making 28 squares; the one on the right contains four columns of nine cartouches each, or a total of 36 squares. To those familiar with the other inscriptions there is nothing remarkable in all this, but if we examine the inscriptions closely we find that each set of double columns is separated from the other one by a wide interval. This is not fortuitous, for we find it is the same on both the right and left sides, with fully as wide a space as we have shown in figures 1, 2, and 3 of the Palenque tablets, in which case it was done merely to demonstrate more clearly the sequences and groups of characters. This conspicuous and plainly marked separation of the double columns in the bas-relief of Bernouilli, we think, is an unassailable proof of the correctness of our theory and should leave no further doubt on the subject.

To recapitulate, we must emphatically state that we find no evidence worthy of consideration to support Plans II, III, IV, and V as to the direction of reading the mural inscriptions of the Mayas. The sequences and progression of the pairs and groups of characters in the inscriptions all point to one method of reading—that of interpreting by double columns where it can be done, as in tablets or assemblages of characters, when in horizontal lines from the left to the right, and in vertical lines from the top to the bottom. Where the horizontal and vertical lines form a right angle, as at the lefthand side of the central figures of the Palenque tablet of the "Cross," it should be read from the

lefthand side to the right, then down the vertical line to the bottom. One objection might be brought forward by asking how we would read the right angle of glyphs on the righthand side of the central figures in the tablet of the "Cross." This, we think, was formed in this way merely to conform with the one on the opposite side, so as not to mar the regular and artistic appearance of the whole inscription. It should be read from the left to the right along the horizontal line and then down the vertical column. Such divergences to the general rule are sometimes necessary when a picturesque and artistic effect for the whole group was desired by the ancient sculptor. We can find some points which corroborate our conclusions from the sequence and rubrication in the ancient Mayan manuscripts. Many pages of these codices are divided into small divisions or compartments by red lines which separate the various sentences or paragraphs, consisting usually of four or six characters.

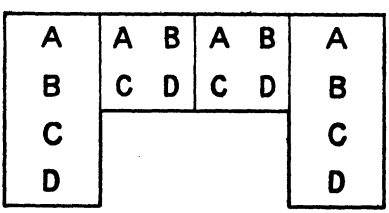

FIG. 4.

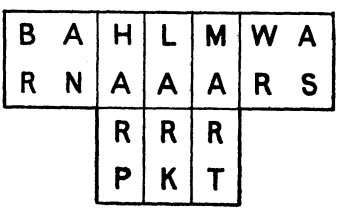

FIG 5.

In figures 4, 5, and 6 we show the general arrangement of these small divisions and compartments which make up each page in the manuscripts, and beneath, at the center or at each side, are usually placed two pictures. We have lettered the characters to show the order and sequence. Let us first examine figure 4. This arrangement was pointed out by M. Pousse[1] as being the usual order in many plates in the manuscripts. The reader will notice that it corresponds to a certain extent with the one used in the Palenque tablet, with the exception of the two outside columns which are to be read from top to bottom in single vertical columns.

It is to the method of reading the two groups of four characters each that we wish to call attention. In this method we read

[1] Archives de la Société Américaine de France, 1887, pp. 27 et seq.

the first two characters from left to right, and then the two immediately below. Then we take the next two to the right above and the next two below, reading in double columns from left to right and from top to bottom, as in the Palenque tablet. We find this order reversed in figures 5 and 6, in which Dr Thomas[1] has pointed out the general arrangement for the characters in certain plates in the Manuscript Troano. But by referring to figures 4, 5, and 6 it can readily be seen that parts of each page are to be read from top to bottom in single columns when so arranged, just as we do in the inscriptions, and also that other portions of each page are to be read in double columns from left to right and from top to bottom.

H	A	H	H	A	H
R	K	A	R	K	A
		N			L
		D			T

FIG. 6.

In closing, we may add that in our opinion sufficient evidence has been presented to satisfy any one beyond a reasonable doubt as to the correct method of reading the inscriptions.

MUSIC OF THE HOPI FLUTE CEREMONY.—In the summer of 1896 the writer had the good fortune to observe, with Dr J. Walter Fewkes, the Flute ceremony at the Hopi pueblo of Walpi, Arizona. In the course of the ritual, which is an invocation for rain, a series of songs are repeated each day for several days.

To one hearing Indian music for the first time the sensation was quite novel. The chorus of priests, rattle in hand, sang in unison before the Flute altar, in a narrow, low room without windows, greatly augmenting the volume of sound.

The time was set by the speaker-chief, who uniformly shook his rattle eight beats in five seconds for all the songs and for each day's songs with the accuracy of a metronome. There were three beats in each measure. The pitch was low, the range limited, and the deep vibrant voices seemed to portray the winds, thunder, rain, the rushing of water, and the elemental forces of nature.

The notation is chromatic, not possible to be expressed on any instrument save the violin or the specially constructed flutes which later accompanied the singing. These flutes marred the

[1] Op. cit., pp. 138, 140.

effect of the voices. They were played in unison on the octave above the voices.

In general effect the music is minor, but frequently major motives of great beauty spring out of dead-level monotonous minors. Sometimes a major motive is followed by a minor counterpart of the same. There is much slurring and an occasional reduplication comes in with great effect. A number of songs are monotonous, with once in a while a strong staccato movement. The closing song was spirited and may truly be called beautiful. It consists of several legato verses, each closing with a turn, a rapid vibration of the rattle, and a solemn refrain. In structure and melody it resembles a Christian hymn. The music reminds one of the Gregorian chants, and to the listener some of the motives seemed quite equal to those upon which Handel built his great oratorios.

The Hopi are noted far and near over the pueblo region as song-makers. It is a matter of surprise to travelers to find a cheerful, happy, music-loving people amid the arid wastes of Tusayan.

Dr Fewkes remarks: "I have heard the music of both the Zuñis and the Hopis, and know of nothing more effective than the singing by the priests at this time [Flute ceremony]. There was something in it which was different from the ordinary *Kōkō* and *Kātci'na* music, and yet there could be no doubt of its aboriginal origin. It was a concert to which the most cultivated could not take exception. The voices of the singers were good, and if the flutes did not give the best accompaniment the vocal part more than made up for their deficiency. Some one who has done me the honor of reviewing my account of Zuñi music has said that this music is strangely enough not hideous yells or ear-splitting discord. I wish every one who has not heard the best aboriginal music could hear the songs of the Flute festival. I know very little about music and have no keen ear for classical productions, but I found in this Indian singing much which pleased me. It would be well to judge the musical capabilities of the Indians by these weird and characteristic songs, not by imaginary war-cries and discordant noises which form the basis upon which Indians have too often been criticised."[1]

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[1] Journal of American Ethnology and Archæology, vol. II, p. 147.